

Estimation of Microbes on Phylloplane Region of Healthy and Infected Leaf of *Ipomoea cairica* by Leaf Impression Method

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Abstract

Phylloplane is the leaf surface itself that harbors a variety of microorganism both pathogens and saprophyte. An infection was reported on Ipomoea cairica plant in DDU Gorakhpur University campus. A general study was conducted on the microbial diversity on the healthy and infected leaf by leaf impression method. The study revealed growth of microbes which would have served as the causative pathogens infecting the plant.

Keyword: *Ipomoea cairica*; pathogens; saprophyte; phylloplane; microbial diversity.

INTRODUCTION

Ipomoea cairica (Figure 1(a) and (b)) is a weed plant belongs to family Convolvulaceae. It possesses certain medicinal characteristics like antioxidant, larvicidal, rheumatism [1]. It has been also tested on various microbes and found to be effective against *E. coli*, *Klebsiella pneumonia*, *Bacillus subtilis*, *Salmonella typhi*, *Aspergillus niger*, *Candida albicans*, *Sacchromyces cerevisiae* [2]. Leaf impression method is a convenient and simple method for studying microbial diversity on the phylloplane region of plants. Phylloplane consist of a habitat for variety of microorganisms. This region contains wide range of species in short time scale which help in quick study and analysis. Culture methods have given an extensive way in enumerating bacterial populations occupying leaf surfaces. A study results that 37 genera and 78 species of bacteria were isolated from wheat and 20 genera from mango leaves [3, 4].

A great finding can be evaluated in text to human pathogens which are able to colonize and survive on plant tissues by examining the interaction in the phylloplane [5, 6]. Research suggests leaf impression methods have shown that bacteria do not occur in an invariable pattern over leaf surface.

In culture free methods the phyllosphere bacterial communities are more diverse than previously detected [7]. In the present study, we have set out microbes grown on the selected culture media by leaf impression method of healthy and infected *Ipomoea cairica* plant. It shows abundant growth of microbes in which some of them could be infective pathogens on diseased leaves.

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Received Date: March 08, 2021

Accepted Date: June 17, 2021

Published Date: July 19, 2021

Citation: Shivangi Sahgal, Deepa Srivastava. Estimation of Microbes on Phylloplane Region of Healthy and Infected Leaf of *Ipomoea cairica* by Leaf Impression Method. Research & Reviews: A Journal of Life Sciences. 2021; 11(2): 11–13p.

METHODOLOGY

Healthy and infected leaves of *Ipomoea cairica* (Figure 1(c) and (d)) was collected from the campus. These samples were placed in sterile plastic bags and transported to the laboratory. Nutrient Agar Medium (NAM) was prepared for culturing bacteria. In order to obtain the bacterial

population on adaxial and abaxial leaf surfaces, leaf imprints were made on agar medium. An intact individual leaf was placed onto agar plate and pressed with smooth end of a sterile glass rod until a clear imprint of the entire leaf was obtained on the agar (Figure 1(e) and (f)). One of the agar plates was selected as control (Figure 1(i)). Plates were incubated for required time interval at 28°C [8, 9]. Cultured plates were observed after incubated period, it showed bacterial growth.

RESULT AND DISCUSSION

The imprints of infected and healthy leaves of *Ipomoea cairica* obtained on the NAM plates showed microbial growth after certain period of time. The result of the conducted experiment suggests the microflora on the phylloplane of infected leaf of *Ipomoea cairica* has vast strength and diversity as compared to the healthy leaves (Figure 1(g) and (h)). Microbial growth on the culture media indicates that it could be the causative pathogen for infecting *Ipomoea cairica* plant. Leaf impression method appeared as better one in terms of extent of detection of microbes on the leaf surface is concerned. Further analysis could be helpful in isolating and identifying different microbes on the plant which may have caused the disease.



Figure 1. (a) Healthy *Ipomoea cairica* plant; (b) Diseased *Ipomoea cairica* plant; (c) Healthy *Ipomoea* leaves; (d) Diseased leaves; (e and f) Imprint of healthy and infected leaves on the culture media plates; (g) Microbial growth from Healthy leaf; (h) Microbial growth from diseased leaf; (i) no growth on plate kept as control.

CONCLUSION

The outcome from the mentioned work will definitely provide a way in discovery of different microorganisms. One could be able to locate the uncovered microbial diversity from the phylloplane of the selected plant. This method is not complex as compared to various methods of locating pathogens. Hence, it can be practiced many times for accuracy. Additional survey and examination potentially will oblige in recognizing contrasting pathogens responsible for causing disease.

ACKNOWLEDGEMENT

The authors are grateful to Head, Department of Microbiology and Head, Department of Botany for their encouragement and support.

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